



PROJECT DEVELOPMENT FACILITY REQUEST FOR PIPELINE ENTRY AND PDF BLOCK B APPROVAL

AGENCY'S PROJECT ID: P090336

GEFSEC PROJECT ID: 2750

COUNTRY: China

PROJECT TITLE: Ningbo Water and
Environment

Related Program: World Bank/Global
Environment Facility Pollution Reduction
Investment Program for the Large Marine
Ecosystems of East Asia.

GEF AGENCY: World Bank

OTHER EXECUTING AGENCY(IES):

PDF B DURATION: 12 months

GEF FOCAL AREA: International Waters

GEF OPERATIONAL PROGRAM: OP10: Contaminant-based;

GEF STRATEGIC PRIORITIES: IW1 - catalyzing policy reforms and pollution reduction
measures; IW3 - demonstrating, testing, and replicating innovative ways to reduce land-based
pollution; and B4 - generation and dissemination of best practices for addressing current and
emerging biodiversity issues.

ESTIMATED STARTING DATE (PDF-B): May 2005

ESTIMATED WP ENTRY DATE: May 2006

RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT:

Name: Mr. Wang Bing

Date: 10 March 2005

Ministry of Finance, China

(Endorsement letter attached)

This proposal has been prepared in accordance with GEF policies and procedures.

Steve Gorman
IA/ExA Coordinator
Date: May 5, 2005

FINANCING PLAN (US\$)	
GEF ALLOCATION	
Project (<i>estimated</i>)	5,000,000
Project Co-financing	136,000,000
PDF A*	
PDF B**	350,000
PDF C	
<i>Total PDF Financing:</i>	350,000
PDF Co-financing	
Local government	185,000
Total PDF Financing	535,000

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PART I - PROJECT CONCEPT

A - SUMMARY

1. STRATEGIC FRAMEWORK

East Asia's rapid economic growth has been accompanied by significant environmental degradation. Land-based pollution of the region's seas, coasts, estuaries and rivers is one of its most severe environmental problems and is degrading the region's large marine ecosystems (LMEs). To help the littoral states address this problem, the GEF and World Bank, in collaboration with other partners such as the GEF/UNDP/IMO Partnership for Environmental Management of the Seas of East Asia (PEMSEA), are planning to establish a Pollution Reduction Program for the Large Marine Ecosystems of East Asia (the Program). The Program is scheduled to be presented to the GEF Council in late 2005. The objective of the Program is to scale-up investment in land-based water pollution reduction in the region's coastal areas and major river basins. The Program comprises an investment component that will co-finance World Bank pollution reduction investment projects, and a revolving fund(s) component that will provide reimbursable financial incentives to private pollution reduction investors/managers.

The *Ningbo Water and Environment Project* (NWEP) described herein is the first World Bank project proposed for GEF co-financing from the Program's investment component. The NWEP was approved by the World Bank Board in March 2005. Since the project loan processing proceeded faster than the GEF processing, the proposed GEF activities will be processed independently of the loan, but are considered an integral part of the NWEP.

2. PROJECT RATIONALE

The NWEP will be implemented by Ningbo Municipality, which is located 175 km south of Shanghai, borders Hangzhou Bay, and is China's second-largest port. Investments in water supply and pollution control in the municipality have lagged far behind its rapid economic development, so its coastline is severely polluted. Its local governments have now declared pollution reduction a priority and adopted a progressive, sub-regional and multi-sector approach to it. The NWEP would implement that approach, and demonstrate cost-effective and innovative solutions, including a constructed wetland for municipal wastewater treatment and a natural wetland conservation area for non-point source pollution control, biodiversity protection, and environmental education. It would also produce multi-focal area benefits and have high replication potential. The lessons learned from the project would be disseminated throughout the region through the organization of workshops and dissemination of documents, thereby enhancing the prospects for replication. For all these reasons, the proposed project is an excellent candidate for support from the Program.

3. OBJECTIVES

The project's objectives are to reduce land-based pollution of the neighboring coast and the East China Sea, promote the replication of innovative low cost wastewater treatment techniques, and encourage coastal conservation.

4. OUTPUTS

- a. Wastewater treatment: i) two wastewater treatment plants, one in the north of Cixi City (100,000 m³/day) and one in the east (50,000 m³/d); ii) each wastewater treatment plant will have a constructed wetland for tertiary treatment (50 ha in total); iii) an associated collection system of mains and link sewers (230 km of pipe and 58 pump stations); and iv) natural wetland conservation area (20-40 km²) that will reduce non-point source pollution, conserve biodiversity, and promote environmental education.
- b. Institutional Development: Develop the operational and business capabilities of the recently established Cixi Municipal Sewerage Company, and develop environmental conservation and educational programs focused on protecting Hangzhou Bay, including water pollution control and wetland conservation.

B - COUNTRY OWNERSHIP

1. COUNTRY ELIGIBILITY

China is eligible for GEF assistance under the International Waters Focal Area through the World Bank.

2. COUNTRY DRIVEN-NESS

Ningbo Municipality has requested the World Bank and the GEF to co-finance the NWEP so it can learn and apply international best-practice and innovative approaches to wastewater treatment. China's Ministry of Finance has confirmed that the project is a national priority for World Bank and GEF assistance. Local communities have been notified of and briefed on the project through the newspapers, libraries and consultative meetings and have expressed their support for it.

The project is consistent with China's strategy for reducing municipal water pollution, which stresses adequate pricing, service expansion and operational efficiency. It is also consistent with the trans-boundary diagnosis and strategic recommendations of the PEMSEA-facilitated *Sustainable Development Strategy for the Seas of East Asia*, which China has endorsed.

C - PROJECT AND POLICY CONFORMITY

1. PROJECT CONFORMITY

Conformity with OP 10:

The proposed GEF-funded activities under the NWEF, are consistent with the GEF's Operational Program (OP) 10, the Contaminant-based International Waters OP, in that it will demonstrate and encourage replication of innovative and best practice options to overcome the barriers to reducing land-based contamination of an international water body, the East China Sea. To ensure that the Program is value added, it seeks to finance activities within the Bank-financed projects that would not occur if not for the additional GEF funding.

Conformity with overall Program criteria:

The Program Brief, for the Pollution Reduction Investment Program for the Large Marine Ecosystems of East Asia, scheduled for submission to the GEF Council in November 2005, is still under formulation, but the general criteria for financing have already been defined. Pollution reduction components of World Bank projects that are most likely to receive GEF co-financing under the Program typically meet one or more of the following criteria: (i) demonstrate a new pollution control technology or technique; (ii) "try and test" a pilot where there is low public awareness, limited experience, and where the client is not be willing to take on that cost; (iii) are innovative institutional mechanisms or technical solutions to combat land-based water pollution; and (iv) are easily replicable and/or scalable. The Program would focus mainly on pollution hot-spots in the coastal areas of China, Indonesia, Philippines, Vietnam and Cambodia.

The proposed GEF-funded activities under the NWEF clearly meet the criteria listed above. Development of a constructed wetland for wastewater treatment and conservation of a natural wetland for non-point source pollution control will demonstrate a relatively new and innovative pollution control technology for East Asia. Cixi officials have indicated that they would only test these new ideas if they received incentives from GEF, underscoring the incrementality of the GEF funding. The technology has a high potential for replication throughout China and East Asia due to a low capital cost structure and straightforward operations. As noted in Section 4 (Replicability), a comprehensive replication and dissemination strategy is planned both under the project and the overall Program.

Conformity with GEF Strategic Priorities:

The project is also consistent with GEF Strategic Priorities (SP) 1 and 3 for the International Waters Focal Area. With respect to Priority 1, it will facilitate the efforts of a nation that signed the *Putrajaya Declaration of Regional Cooperation for the Sustainable Development of the Seas of East Asia* to mobilize financial resources for implementing policy/institutional reforms and stress-reducing investments to address a priority trans-boundary water issue (land-based pollution of a shared water body) that is highlighted in the declaration. Furthermore, as called for by the SP, these resource mobilization efforts are mainstreamed into the regular program of a GEF agency, in this case the World Bank, under the framework of a strategic partnership among nations and the GEF agencies that supports the World Summit on Sustainable Development's Plan of Implementation.

With respect to Priority 3, the project will demonstrate the feasibility of innovative institutional mechanisms and technical solutions to accelerate investment in facilities that reduce the contamination of an international water body. Its technical solutions include low-cost options that will help financially constrained communities access environmentally-

responsible sewage treatment, while generating a mix of local and global benefits. Moreover, it will contribute to the Global Program of Action for reducing contaminants from land-based activities.

Finally, it will also contribute to Priority 4 on biodiversity by demonstrating synergy between reducing trans-boundary contamination and conserving biological diversity.

2. PROJECT DESIGN

Problem Statement

Unprecedented economic growth in East Asia has resulted in rapid urbanization, especially in coastal cities. The urban population concentration in coastal regions has caused the seas of East Asia to largely bear the brunt of the environmental impact of this development. The result is that land-based pollution of East Asia's seas, coasts, estuaries and rivers is a severe problem that is well-recognized by the countries in the region, particularly China.

The rapid population growth in coastal cities such as Ningbo is making planning and financing for utility services such as water and wastewater very challenging. Advanced technologies for water and wastewater treatment are often applied in China without considering the financial or operational implications, and then subsequently not utilized to simplify operations and reduce costs.

Non-point source pollution from urban and agricultural run-off is a large and growing problem, and a significant contributor to marine pollution. Coastal wetlands provide natural purification for the run-off before it flows into the sea, as well as an important habitat for migratory birds and marine life. Knowledge of the important eco-system functions provided by wetlands is lacking throughout East Asia. There is a clear need to increase awareness and mobilize public opinion to preserve coastal habitats and reduce land-based sources of pollution.

Baseline Scenario

Many of the trends identified above - increased urbanization, coastal cities bearing the brunt of this growth, wetland degradation, and the resulting pollution of the sea - are inevitable. In the worst case scenario, ie. no World Bank project, these trends will continue, as will Ningbo's challenges with long-term wastewater treatment. In the baseline scenario, ie. with the Bank project but without GEF co-financing, the NWEP will assist Ningbo City and Cixi with water supply planning and with waste water treatment investment. However lack of local experience with innovative solutions and concerns about cost will limit the scale of Bank investments to conventional treatment facilities. Moreover, important opportunities to conserve wetland habitat, promote environmental education, and disseminate knowledge will be foregone.

The baseline project has three components

- a) Component 1: Ningbo Water Supply (US\$184 million): The component includes: i) raw water supply line consisting of an intake tower in Jiakou reservoir and a 9.6 km tunnel; ii) 500,000 m³/day Maojiaping water treatment plant; and iii) treated water transmission pipes, including a 37 km main from Maojiaping leading to a 47 km ring main around Ningbo City. The component is a significant part of Ningbo's overall plan to cover the entire City, improve water quality by accessing new water sources and upgrade water treatment, and enhance distribution system reliability and flexibility. The ring main will be the first of its kind in China.
- b) Component 2: Cixi Wastewater (US\$130.0 million): The component includes: i) two wastewater treatment plants, one located in the north of Cixi (100,000 m³/day) and one in the east (50,000 m³/d); and ii) associated collection system mains and link sewers (230 km of pipe and 58 pump stations).
- c) Component 3: Institutional Development (US\$6 million): Technical assistance will be provided to improve water planning, utility price and service regulation, and to enhance the Cixi Municipal Sewerage Company (CMSC) operational and business management capacities. Technical assistance on design review and construction management will also be provided to ensure smooth implementation of the infrastructure works.

GEF Alternative Scenario

Under the GEF alternative scenario, GEF co-financing would support a significant **enhancement of the Cixi wastewater component of the NWEF**. With GEF support, Cixi would utilize a constructed wetland to provide tertiary treatment for the two wastewater treatment plants. It would also establish a large conservation protection area (20-40 km²) to protect and conserve the coastal wetland areas that Cixi officials recognize as ecologically valuable both in terms of wildlife habitat and enhancing water quality. Finally, GEF funds will be used to develop an innovative environmental education program on conserving coastal wetlands.

Neither the constructed wetland nor the wetland conservation zone would be funded under the baseline project because these components utilize new technologies and techniques with which Cixi is not familiar. Hence, GEF support will help Cixi meet its wastewater treatment requirements through innovative new solutions, which Cixi City would be unlikely to undertake on its own. Following is a summary of the two additional GEF components:

a) GEF Component 1 - Constructed Wetland:

NWEF will finance two wastewater treatment plants (WWTP) in Cixi. The WWTPs will discharge into the inland canal network, and thus require a high level of treatment to avoid eutrophication and other water quality problems as the canals have a relatively low assimilative capacity. Discharge into Hangzhou Bay through an outfall is not an

economically viable option given the large tidal variation and shallow water along the Cixi coastline. The WWTPs are designed to meet Class 1A discharge standards, which are essentially 10 mg/l BOD and SS, with removal of nutrients to 15 mg/l total-nitrogen and 0.5 mg/l of phosphorus. The proposed treatment process is a modified A²O process, with tertiary treatment. Two options were considered for tertiary treatment during project preparation: i) constructed wetland; and ii) conventional chemical coagulation/filtration. Provided GEF support can be made available, Cixi authorities prefer the constructed wetland option.

Constructed wetlands are artificial wastewater treatment systems, which consist of shallow ponds or channels that have been planted with aquatic plants, and which rely on microbial, biological, physical, and chemical processes to treat wastewater. They typically have impervious clay or synthetic liners, and constructed structures to control the flow direction, liquid detention time, and water level. Depending on the type of system, they may contain an inert porous media such as rock, gravel or sand. Constructed wetlands provide advanced treatment to effluent from conventional wastewater treatment plants, and also provide other benefits such as wildlife habitat.

The World Bank has worked with Cixi authorities to explain the treatment, environmental and cost benefits of constructed wetlands. Fortunately, there are large tracts of recently reclaimed land in Cixi that are owned by the government and that makes the sizing of approximately 50 ha constructed wetlands cost-effective and straight forward. Constructed wetlands are a new technology in China, however, and Cixi authorities are hesitant about adopting it. The estimated cost of the two constructed wetlands, one for each wastewater treatment plant, is approximately US\$5.0 million and the World Bank will finance approximately half of the costs, while Cixi is responsible for financing the remainder. The Cixi government favors the constructed wetland approach, if GEF funding can be made available to cover part of the counterpart financing needs. Thus GEF funding will be instrumental in demonstrating new water pollution control technology, which also has important ecological benefits.

b) GEF Component 2: Wetland Conservation and Environmental Education

The high suspended solids concentration in Hangzhou Bay, combined with hydrological and tidal currents, results in sediment accretion along the northern Ningbo coastline, with accretion rates on the order of 50-100 meters per year. According to Cixi City's Plan for Integrated Beach Development (1997-2010), approximately 130 km² of land will be enclosed by sea-dikes between 2000 and 2010. The reclaimed land will be carefully planned and developed with a combination of agricultural and aquaculture areas, industrial estates, coastal tourism, and wetland conservation zones. The area outside of the sea dike is called the "beach-area" and the width of the beach area varies depending on the tide but can extend hundreds of meters at low tide. Both the area inside and outside of the sea dike has rich benthos resources and vegetation, and provide an excellent habitat for migratory and indigenous water birds. In addition, there is considerable aquaculture in the near shore area (i.e. just outside the sea dikes) including snails, crabs, and fish. In

contrast to most situations, wetland areas are actually being created in Cixi due to the sediment accretion along the coastline.

The Cixi Government understands the importance of the coastal habitat and intends to conserve significant ecological areas and promote eco-tourism, while at the same time promoting rapid industrial and urban development. The government is in the early stages of regional eco-system planning and would like GEF funds and expertise to assist in this effort. One of the most exciting concepts is a wetland conservation area (approximately 20-40 km²) and an environmental education center located at the foot of the Ningbo (Cixi)-Shanghai Bridge. When the bridge is complete it will be the longest bridge in the world and will convey millions of vehicles per year across Hangzhou Bay. The objective is to construct a world-class environmental education center which will be fun and interesting to visit, and increase public awareness of the need to protect East Asia seas by reducing water pollution and protecting critical habitat. The creation of a wetland conservation area in Cixi will also help reduce non-point water pollution into Hangzhou Bay. Polluted run-off from agricultural and urban areas would drain into the wetland area and be naturally purified by the wetland.

3. SUSTAINABILITY (INCLUDING FINANCIAL SUSTAINABILITY)

Ningbo Municipality is strongly committed to the success of the project as the future economic development of Ningbo City and Cixi City depend on successful project implementation. The degree of importance attached to the NWEF project is reflected in the active participation of high-level government officials in the Leading Group. The Project Management Office (PMO) has been established as a permanent government agency, and thus is able to attract qualified individuals who are offered job security and promotion potential. NWSC and CMSC have invested significant amounts of their own funds in project prepared and have prepared high quality feasibility studies, environmental assessments, and resettlement action plans.

Financial sustainability of the companies is critical to the success of the project. Ningbo City and Cixi City have demonstrated their commitment to ensuring adequate revenues for the companies by significantly increasing tariffs in 2004. Legal covenants for increasing tariffs in 2006 and 2008 have also been agreed upon by the Municipal Government. Both NWSC and CMSC have well qualified technical staff that can ensure efficient operation of the facilities.

4. REPLICABILITY

Finding low cost methods for wastewater treatment and building public support for pollution control and environmental conservation in China, and throughout the region, is critical. The overwhelming majority of Chinese -- 94 percent -- live in the eastern third of the country. Of China's 1.2 billion people, over 677 million (56 percent) reside in 13 southeast and coastal provinces and two coastal municipalities -- Shanghai and Tianjin. Along much of China's

18,000 kilometers of continental coastline, population densities average over 600 per square kilometer. Much of the wastewater generated along the coast is untreated and flows into the sea, resulting in massive and frequent red tides, adverse impacts on marine fisheries and aquaculture, and consequent public health problems.

Examples of innovative wastewater treatment and pollution reduction methods, if properly disseminated and replicated, will have a significant impact on reducing pollution in the LMEs of East Asia. The GEF-supported constructed wetland will provide tertiary treatment for the two new Cixi wastewater treatment plants. They will reduce BOD and suspended solids, as well as nutrients such as phosphorous and nitrogen, which are the key culprits in the red tide phenomena. Constructed wetlands can also be used as the primary treatment process in certain situations. Constructed wetlands offer the advantages of low capital costs (assuming land costs are not prohibitive), robust treatment performance, low operating costs and simplicity of operations, and environmental amenities. The proposed natural wetland conservation area will also reduce non-point source pollution. Finally, the accompanying environmental education center, located in a strategic location at the foot of the Shanghai-Ningbo bridge, will improve awareness of pollution control and coastal protection efforts in China and throughout the region.

The project will fund a multi-pronged replication strategy, including: (i) a series of workshops in Ningbo to share experiences for both the constructed wetland and natural wetland conservation. Stakeholders from throughout China, including other coastal cities and national environmental authorities, will be invited. The workshop material will be in both in English and Chinese, and representatives from PEMSEA will be invited to attend and help disseminate the experience and workshop documents; (ii) Ningbo representatives will participate in conferences sponsored by GEF or PEMSEA, such as the biannual GEF International Waters Congress and the PEMSEA East Asia Seas Congress; (iii) the proposed environmental education center will serve as a comprehensive source of information as people from throughout China and East Asia can visit the center and learn more about the GEF-supported activities in Ningbo. In collaboration with GEF and PEMSEA, the environmental education center can also present exhibits about other efforts throughout East Asia to reduce marine pollution and protect marine eco-systems. The center will be a key replication mechanism for the project.

In addition to the project-funded replication activities described above, the overall Program will also include separately funded activities to disseminate and promote the adoption of various technologies and pilot projects financed under the Program.

5. STAKEHOLDER INVOLVEMENT / INTENDED BENEFICIARIES

There are multiple beneficiaries for the GEF activities including: i) fisherman and aquatic farmers along the coast line, as well as the people who consume the renowned seafood from Cixi; ii) environmentalists who are interested in preserving wetlands and migratory bird habitats; iii) citizens in Cixi who wish to enjoy a clean and healthy environment; iv) industries in Cixi who want to ensure their operations have minimal impact on the

environment in the most cost-effective manner; and v) the multiple government agencies responsible for environmental protection and land management in Cixi and Ningbo municipality. Cixi government will attempt to identify suitable non-governmental partners, such as international conservation organizations or universities to assist in the development of the environmental education center.

During the preparation of the proposed project, there will be consultations with all of these key stakeholder groups, and an effort made to reach consensus on appropriate project design. The results of the consultations will be recorded and analyzed, and a stakeholder plan will be produced as a specific block-B activity.

6. MONITORING AND EVALUATION

The Cixi wastewater component of NWEF, including GEF-funded activities, is expected to reduce COD discharges flowing into the East China Sea by an estimated 15,000 tons per year. The annual pollutant reduction from the GEF-funded constructed wetland is estimated at 2,000 tons of COD, 200 tons of total phosphorus, and 900 tons of ammonia nitrogen (NH₃-N). The reduction of pollution due to the natural wetland is difficult to estimate due to the diffuse nature of non-point sources of pollution, but an estimate will be made during preparation. The NWEF includes a comprehensive evaluation of wastewater treatment plant performance which will also be used for GEF evaluation purposes. The M&E program will monitor influent and effluent concentrations of key parameters (including BOD, COD, SS, nitrogen, and phosphorous) to demonstrate compliance with Chinese environmental standards, as well as monitor total amounts of pollution prevented from entering the East China Sea for GEF purposes. The M&E program will place a special emphasis on evaluating the performance of the constructed wetlands for scientific and operational purposes.

In addition to reducing pollution from the Cixi wastewater treatment plants, an important objective of the project is to disseminate the experience of the constructed wetland and help educate the public about the importance of protecting the seas and coastal wetlands. M&E indicators for this objective, for example the number of visitors to the education center, the number of workshops, and the number of presentation by Ningbo representatives, will be developed during preparation.

D - FINANCING

Total Estimated Project Cost (Cixi Component Only): US\$141 million

1. Counterpart Funding: Cixi City-\$76 million
2. World Bank: US\$60 million
3. Proposed GEF co-financing: US\$5 million

E - INSTITUTIONAL COORDINATION AND SUPPORT

1. CORE COMMITMENTS AND LINKAGES

The project is a proposed component of the World Bank/Global Environment Facility *Pollution Reduction Investment Program for Large Marine Ecosystems of East Asia*. Its design reflects the lessons learned from the World Bank's large portfolio of water pollution reduction projects, including the WB/GEF Danube/Black Sea Program.

The project will address two key themes of the World Bank's China Country Assistance Strategy: i) accelerating the transition to a market economy through improving public sector management and delivery of services; and ii) facilitating an environmentally sustainable development process through better management of water resources. Two strategic issues for the Bank's urban development program in China will be highlighted in the project design:

- A focus on ***urban water planning and resource management*** where problems are reaching a crisis level in many cities, including Ningbo. The project will be the first major Bank-financed urban water supply operation since the mid-1990s.
- A concentration on ***regional integration*** by providing water and wastewater infrastructure, and management systems that transcend administrative boundaries.

The Ningbo Municipal Government, and the lower-level Cixi City government, are committing to preserving their ecological resources and reducing pollution into the East Asia Sea. Ningbo, in contrast to most Chinese cities, has taken the initiative to address water issues through a *regional* approach with establishment of a multi-sector *Water and Environment Leading Group* chaired by the Executive Municipal Vice Mayor and headed by the Municipal Planning Commission. The Leading Group has a dynamic Secretariat, and is facilitating infrastructure investments and management systems which cut across administrative boundaries to resolve Ningbo's serious water and wastewater problems.

Cixi City government is also demonstrating its core commitment to the project objectives by agreeing to preserve space for both the natural and constructed wetlands. Given the high population density and rapid economic growth in China, land is extremely valuable, and the decision to use the land for environmental purposes rather than industrial and urban development carries high opportunity costs for the Cixi government. The Cixi government realizes, however, that its most important natural feature, the attribute which sets it apart from other places, is its highly productive shoreline.

2. CONSULTATION, COORDINATION AND COLLABORATION BETWEEN AND AMONG IMPLEMENTING AGENCIES, EXECUTING AGENCIES AND THE GEF SECRETARIAT.

The project is part of the *World Bank/GEF Pollution Reduction Investment Program for Large Marine Ecosystems of East Asia*, jointly developed in close collaboration with the GEF/UNDP/IMO PEMSEA initiative. PEMSEA's main achievement has been the development of the *Sustainable Development Strategy for the Seas of Asia (SDS-SEA)*, which was endorsed by the ministers of twelve East Asian countries in December 2003, and which lays out a road-map for improving and sustaining the seas of East Asia. It is on the basis of this strategy that the WB/GEF Investment Program was created. The Program, therefore, seeks to collaborate with the implementation action plans of PEMSEA, as well as other initiatives in the region such as the UNDP/GEF Yellow Sea and South China Sea initiatives.

During project preparation a survey of on-going related activities among other implementing agencies, executing agencies, and the GEF Secretariat will be undertaken and a plan for appropriate collaboration will be conceived.

PEMSEA's Secretariat has been briefed on Ningbo and will help to disseminate information about this project. PEMSEA's regional project - *Implementation of the Sustainable Development Strategy for the Seas of East Asia* - provides an extremely useful coordination function that the Ningbo project will seek to take advantage of in term of spreading the lessons learnt and the replicability potential of the wetland technology for pollution reduction throughout the LMEs of East Asia.

3. IMPLEMENTATION/EXECUTION ARRANGEMENTS

The implementing agency for the project will be the World Bank, through the East Asia Urban Sector Unit (EASUR), which is responsible for the overall *Global Environment Facility Pollution Reduction Investment Program for Large Marine Ecosystems of East Asia*. The World Bank task team responsible for the Ningbo Water and Environment Project will also supervise the GEF project.

The project will be executed by the Ningbo Municipal Government, under the policy direction of the Water and Environment Leading Group. The NWEP Project Management Office will administer the GEF project funds in collaboration with the Ningbo Municipal Finance Bureau.

The actual GEF-related project activities will be undertaken at the Cixi government level. The constructed wetland activities will be managed by CMSC, which is a 100% government-owned company under the authority of the Cixi government. CMSC is the owner and operator of the wastewater treatment plants financed under the project.

For the GEF-funded natural wetland component, the activities will be under the authority of the Vice Mayor of Cixi City, who will establish a special working group consisting of relevant government agencies including the Planning Commission, Environmental Protection Bureau, Land Resource Management Bureau, Agriculture Bureau (which includes the Marine

Bureau), Construction Bureau, etc. The exact implementation responsibilities will be defined during project preparation.

PART II - PROJECT DEVELOPMENT PREPARATION

A - DESCRIPTION OF PROPOSED PDF ACTIVITIES

The activities during the PDF-B grant period are described below:

1. Activity 1: Review Design of Constructed Wetland: An international expert would be contracted to review the feasibility study of the constructed wetlands for the Cixi wastewater treatment plants. Domestic consultants have limited experience with constructed wetlands, and the involvement of an international expert to review the design is essential to ensure the wetland functions as intended. The expert is expected to make 2-3 trips to Ningbo, each trip approximately 2 weeks, as well as provide design support from his home office. The expert will advise on how to prepare educational programs related to wetlands and wastewater treatment education.
2. Activity 2: Prepare Terms of Reference: A consultant(s) would be contracted to prepare TORs for the following:
 - a) *Regional Ecological Planning Study*: The study will help integrate ecological issues into the overall Cixi Master Plan and develop specific plans for three areas: i) Cixi wetland conservation area; ii) coastal mudflats; and iii) “ecological corridors” within recently reclaimed land.
 - b) *Conceptual Design and Start-Up Support for an Environmental Education Center*: A consultant would be contracted to prepare a TOR for the conceptual design of an Environmental Education Center in the wetland conservation area, as well as provide start-up support for the operations of the Center. The conceptual design includes the building architecture, educational exhibits for the Center and within the wetland conservation area, educational programs, etc. The conceptual design will also look at organizational arrangements, financing, and marketing the Center’s attractions. Cixi will use its own funds for the structural design and construction of the Center. GEF funding will support consultancy services during the start-up operations for the Center.
3. Activity 3: Prepare M&E and Stakeholder Plan: In addition to the overall NWEP monitoring and evaluation program, a specific monitoring and evaluation program for the GEF components’ objectives, outputs, and inputs will be developed. The M&E program will assess the actual pollution reduction achieved through the project, and the results will be used for improving operational performance, as well as providing scientific information on the constructed wetland which will be disseminated for the use of other interested parties. It will also assess the impact of the dissemination and education objective of the project: number visitors to the education center, workshops, and conference presentations.

Stakeholder participation will be important during both the preparation and implementation stages. A consultant will therefore prepare a “stakeholder assessment and consultation plan”

at the start of the assignment to support project preparation, which will be followed by the preparation of a comprehensive consultation plan to guide project implementation.

4. Activity 4: Assess Replication Potential: A general assessment of the potential for engineered wetlands in China, particularly along the coastal areas will be conducted. The scope of coastal wetland conservation, and potential impacts on reducing land based sources of marine pollution and protecting important conservation areas will also be considered. These assessments will assist in the design of specific replication and dissemination activities under the project, including workshops, conference presentations, and technical publications.
5. Activity 5: Prepare GEF Project Documents: A consultant experienced in GEF project preparation would be contracted to assist Cixi City in the preparation of the necessary documents for GEF and World Bank appraisal and approval.
6. Activity 6: Conduct Workshops and Study Visit: There would be a series of stakeholder workshops on project design. In addition, study visits within China and other countries could be organized to provide examples of constructed wetlands and wetland protection areas.

B - PDF BLOCK B OUTPUTS

1. Design Review and Advisory Report which ensure proper functioning of the constructed wetlands.
2. Terms of Reference for i) Regional Ecological Planning; ii) Environmental Education Center, suitable for soliciting proposals.
3. Monitoring and Evaluation Plan; Stakeholder Consultation Plan.
4. Assessment of Replication Potential and Strategy Under the Project
5. GEF Project Documents for Cixi Wastewater and Wetland Management, suitable for World Bank and GEF appraisal.
6. Workshop and Study Visit Reports.

C - INSTITUTIONAL ARRANGEMENTS

The Ningbo-Cixi PDF B activities will be jointly executed by the Ningbo Municipal Government (US\$225,000) and the World Bank (US\$125,000). The World Bank task leader for the NWEF will be responsible for contracting international consultants to assist Ningbo/Cixi in the development of the project proposal. The Ningbo Municipal Government will designate the PMO for the NWEF and the Municipal Finance Bureau as the responsible parties for the PDF-B grant. The PMO will be responsible for contracting domestic consultants to assist in project preparation and for obtaining any necessary domestic clearances. The PMO will support the Cixi

Steering Committee headed by a Vice Mayor, related Cixi government agencies, as well as the Cixi Municipal Sewerage Company.

D - TIMELINE & BUDGET

See Annex 1. The PDF-funded activities are expected to begin immediately after GEF approval of the proposal in May 2005 and will be completed by May 2006, with the aim of submitting the Ningbo-Cixi project proposal to the GEF Council in parallel with the Program for “*Pollution Reduction Investment Program for Large Marine Ecosystems of East Asia*” in late 2005/early 2006. The budget estimate is presented below:

Cost Estimates for Ningbo PDF-B Proposal			
		WB Executed	Ningbo Executed
1. Constructed Wetland Review	\$70,125	\$52,925	\$17,200
2. Preparation of Terms of Reference	\$135,050	\$0	\$135,050
3. Preparation of Project Documents	\$93,375	\$73,175	\$20,200
4. Workshops and Incremental Costs	\$50,000		\$50,000
Total	\$348,550	\$126,100	\$222,450

PART III – RESPONSE TO REVIEWS

A - CONVENTION SECRETARIAT

B - OTHER

ANNEX 1 - TIMELINE AND BUDGET: NINGBO COMPONENT ACTIVITIES

PDF B BUDGET – Part 1					
Activities	Deliverables	Costs (US \$)		Organization Responsible for Deliverable	Deadlines
		GEF PDF B	Co-Financing		
1. Design Review of Constructed Wetland	Design Report	\$70,000	\$100,000 (SMEDI Design)	World Bank	July 2005
2. Prepare TOR for Cixi Eco-System Planning	Terms of Reference	\$70,000	\$25,000 (Cixi Government Support)	Ningbo PMO	October 2005
3. Prepare TOR for Environmental Education Center	Terms of Reference	\$65,000	\$25,000 (Cixi Government Support)	Ningbo PMO	October 2005
4. Workshops Study Visit	Workshop and Study Visit Reports	\$50,000	\$10,000 (Cixi and Ningbo Government Support)	Ningbo PMO	July-December 2005
5. Prepare Project Documents	GEF Project Document for Approval	\$95,000	\$25,000 (Cixi and Ningbo Government Support)	World Bank and Ningbo PMO	March 2006
TOTAL		350,000	\$185,000		

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